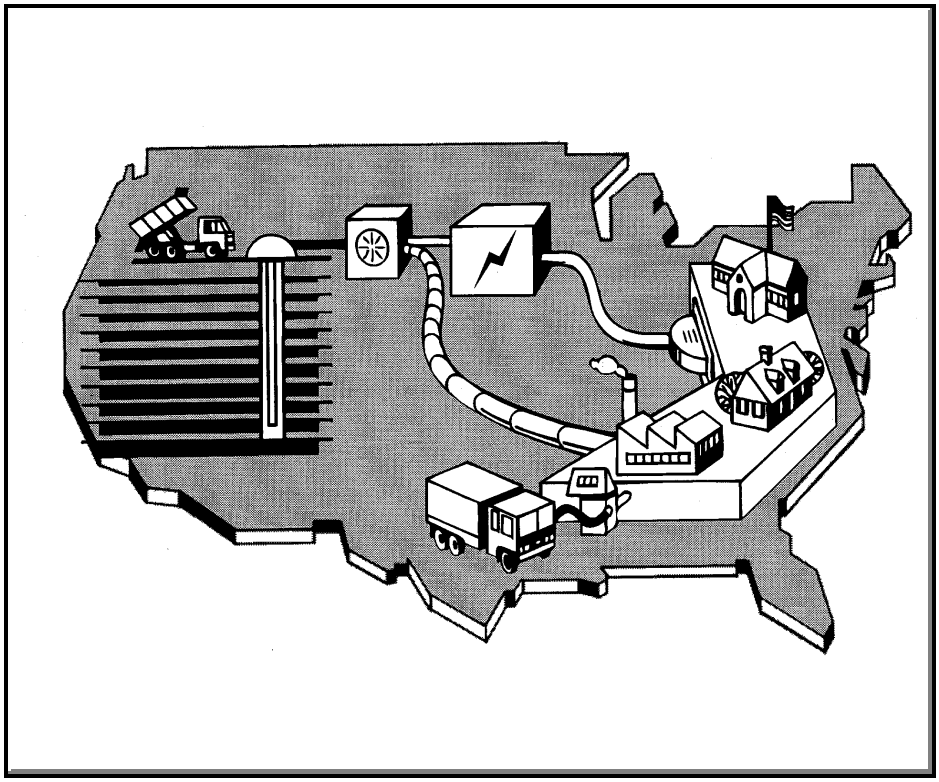
United States Environmental Protection Agency | Office of Air and Radiation (6202J) | EPA 430-K-99-020 January 1999

Landfill Gas-to-Energy Project Opportunities

Landfill Profiles for the State of Nevada



LANDFILL METHANE OUTREACH PROGRAM

EPA Landfill Methane Outreach Program

The EPA Landfill Methane Outreach Program, a key component of the United State's *Climate Change Action Plan*, encourages the use of landfill gas (LFG) as an energy resource. EPA assists utilities, municipal and private landfill owners and operators, tribes, and state agencies in reducing methane emissions from landfills through the development of profitable landfill energy recovery projects. Methane captured from landfills can be transformed into a cost-effective fuel source for electricity, heat, boiler and vehicular fuel, or sale to a pipeline. EPA estimates there are approximately 200 landfill methane recovery projects in the U.S. and that up to 750 landfills could install economically viable landfill energy projects.

The Landfill Methane Outreach Program includes five important components: the State Ally, Energy Ally, Industry Ally, Community Partner, and Endorser programs. EPA establishes separate alliances with state agencies, energy providers (including investor-owned, municipal and other public power utilities and cooperatives), key trade and public sector associations, members of the landfill gas development industry (including developers, engineers, equipment vendors, and others) and local communities, municipalities and landfill owner/operators through a Memorandum of Understanding (MOU). By signing the MOU, each Ally/Partner acknowledges a shared commitment to the promotion of landfill gas-to-energy recovery at solid waste landfills, recognizes that the widespread use of landfill gas will reduce emissions of methane and other gases, and commits to undertake activities to enhance development of this resource. In return, EPA agrees to provide landfill gas-to-energy project assistance and public recognition of the Allies' and Partners' participation in the program.

Introduction

Since 1994 the U.S. EPA's Landfill Methane Outreach Program (LMOP) has participated in an ongoing effort to gather information on Municipal Solid Waste landfills (MSW). A key component of the LMOP is to provide MSW landfill owners and operators, project developers, utilities, and other potential project participants with information on MSW landfills that may offer attractive energy development opportunities. This document presents state specific landfill information, hereinafter referred to as the landfill profiles. These profiles are useful to evaluate the potential for developing landfill gas-to-energy projects (LFGTE). EPA assembled this information from state and local sources as well as various national solid waste publications, landfill owners and operators, and project developers.

The EPA has prepared a separate document to describe the methodology used to develop the state-specific landfill profiles and estimate the benefits of using LFGTE as an energy source. The document, *Landfill Gas-to-Energy Project Opportunities, Background Information on Landfill Profiles*, contains background information on gas collection and use, describes the data fields according to the five sections listed on the landfill profiles, and where applicable, illustrates calculations and default values used to derive estimates. EPA strongly recommends that users read the document prior to using the landfill profiles. Users can obtain the document by calling the LMOP hotline at 1-888-STAR-YES.

Data Sources

- EPA-ORD Landfill Gas Utilization-Survey (Thorneloe, 1997)
- Directory and Atlas of Solid Waste Disposal Facilities (SWA, 1994)
- Implementation Guide for Landfill Gas Recovery Projects in the Northeast (SCS, 1994)
- Landfill Gas-to-Energy 1994-1995 Activity Report (SWT, 1994)
- Methane Recovery from Landfill Yearbook (GAA, 1994)
- Project developers, landfill owners, and operators
- State and local records
- Survey of Landfill Gas Generation Potential (EPRI, 1992)
- U.S. Landfill Directory (SWANA, 1992)

Landfill Classification

To facilitate the use of available landfill information, EPA has categorized the landfills into five categories: Current Project,[1] Candidate Project, Shutdown, Other, and Unknown waste-in-place (WIP). These categories are based on the status of the landfill's LFGTE project(s) and WIP. The generation of methane is a function of many factors, the most critical being the amount of waste-in-place and the number of years the waste has been in the landfill. Peak methane generation occurs soon after closure; therefore, the longer the landfill has been closed, the less attractive it becomes for methane recovery. Based on the general timing of peak methane generation, EPA assumes that landfills that ceased accepting waste prior to 1993 have a low probability of generating enough methane to make a gas recovery project economical. Consequently, landfills need to be operating in 1993 to be considered as having a Candidate Project.

Landfill Categorizes

Current Project:
- Landfill with operational LFGTE project or landfill with LFGTE project under construction.

Candidate Project:
- Landfill with a potential or planned LFGTE utilization project; or
- Landfill is currently operating or closed after 1993; and has more than 1,000,000 tons of municipal solid waste-in-place.[2]

Shutdown:
- Landfill with shutdown LFGTE project.

Other:
- Landfill has less than 1,000,000 tons of municipal solid waste-in-place with no current or planned LFGTE project.

Unknown WIP:
- Landfill with insufficient data to determine the waste-in-place.

State Summary

State-specific landfill profile information is summarized in three exhibits. Exhibit 1 presents a summary of the state-specific potential for LFG utilization energy by landfill category. Exhibit 2 summarizes the emissions avoided by fossil fuel displacement for electricity generation and direct use projects. Exhibit 3 presents an index of the state-specific MSW landfills, referenced by category, landfill name and general characteristics.

[1] Current projects illustrate the wide range of successful project development options.

[2] By modeling the relationship between WIP and methane generation, a cut-off of 1,000,000 tons of WIP was established; landfills having at least 1,000,000 tons of WIP are considered candidate landfills.

LANDFILL METHANE OUTREACH PROGRAM

Exhibit 1: Nevada MSW Landfill Summary

Category	No. of Landfills	Est. Capacity Potential		Est. CH4 Generation (mmscf/d)	Methane Reduction (tons/yr)		CO2 Equivalent of CH4 Reduction (tons/yr)	
		Electricity (MW)	Gas Capacity (mmBtu/hr)		Potential	Current	Potential	Current
Candidate	5	28	282	9	52,119	0	1,094,507	0
Other	3	8	76	2	14,000	0	293,990	0
Unknown WIP	1							
Total	9	36	358	11	66,119	0	1,388,497	0

Exhibit 2: Potential Nevada Emissions Avoided by Fossil Fuel Displacement

Category	Electricity Generation Project						Direct Use Project					
	CO2 (tons/yr)			SO2 (tons/yr)			CO2 (tons/yr)			SO2 (tons/yr)		
	Coal	Oil	Natural Gas	Coal	Oil	Natural Gas	Coal	Oil	Natural Gas	Coal	Oil	Natural Gas
Candidate	222,576	182,680	122,837	1,407	1,176	0	156,951	128,818	86,619	1,428	751	1
Other	59,985	49,233	33,105	379	317	0	42,158	34,601	23,266	384	202	0
Unknown WIP												
Total	282,561	231,913	155,942	1,786	1,493	0	199,108	163,419	109,885	1,812	952	1

Exhibit 3: Index of Landfills in Nevada

Category	Landfill Name	WIP			Landfill Operating in 1998	LFG Collected	LFG Utilization Project	Status of LFGTE Project
		<2.5 million tons	2.5 to 4 million tons	>4 million tons				
Candidate	Apex Regional LF	☐	☐	☑	☑	☐	☐	Unknown
Candidate	Boulder City LF	☑	☐	☐	☑	☐	☐	Unknown
Candidate	Elko City LF	☑	☐	☐	☑	☐	☐	Unknown
Candidate	Lockwood LF	☐	☐	☑	☑	☐	☐	Unknown
Candidate	Ormsby SLF	☐	☐	☑	☑	☐	☐	Unknown
Other	Pahrump LF	☑	☐	☐	☑	☐	☐	Unknown
Other	Sunrise Landfill	☐	☐	☑	☐	☐	☐	Unknown
Other	Winnemucca LF	☑	☐	☐	☐	☐	☐	Unknown
Unknown WIP	Douglas County Landfill	☐	☐	☐	☐	☐	☐	Unknown

Apex Regional LF — *Landfill Category:* Candidate

A. GENERAL LANDFILL INFORMATION

Landfill Owner:	Republic Industries Inc	Annual Acceptance Rate (tons):	1,001,000
Landfill Owner Type:	Private	Year Annual Acceptance Rate Reported:	1998
Alternative Landfill Name:		Design Capacity (tons):	
City:	Apex	Acres Currently Landfilled (acres):	
County:	Clark	Average Depth (feet):	
State:	NV	1995 Waste-in-Place (tons):	5,211,913
Year Open:	1993	*1998 Waste-in-Place (tons):*	9,120,848
Year Closed:	2093		

B. LANDFILL GAS COLLECTION

Estimated Methane Generation (mmscf/d):	2.75
LFG Collection System Status:	
Current LFG Collected (mmscf/d):	
Collection and Treatment System Required Under NSPS/EG:	No

C. LANDFILL GAS UTILIZATION

Current Utilization:

Utilization System Status:	Unknown
Utilization System Type:	Unknown
Utilization System Start Year:	
Electric Utility Provider(s):	
Natural Gas Provider(s):	
Energy Purchaser(s):	

Capacity:	Electricity Generation Project (MW)	OR	Direct Use Project (mmBtu/hr)
Estimated Potential Capacity:	9		86
Current Capacity:			
Planned Capacity:			

Utilities in County: Boulder City Electrical Distr System; Colorado River Commission of Nevada; Nevada Power Compan

D. ENVIRONMENTAL BENEFITS OF UTILIZATION

	Potential	Current
Methane Reduction (tons/yr):	15,905	0
CO2 Equivalent of CH4 Reduction (tons/yr):	333,995	0

Emissions Avoided by Fossil Fuel Displacement:	*Electricity Generation Project*		*Direct Use Project*	
	CO2 (tons/yr)	*SO2 (tons/yr)*	*CO2 (tons/yr)*	*SO2 (tons/yr)*
Coal:	67,878	429	47,894	436
Fuel Oil:	55,711	359	39,309	229
Natural Gas:	37,461	0	26,432	0

E. CONTACT INFORMATION

	Landfill Owner	Landfill Operator
Contact Name:	Steve Kalish	Paul LaBruzzo
Mailing Address:	770 East Sahara Ave., Suite 400 PO Box 98508,89193	770 East Sahara Avenue Suite 400
Phone Number:	702-735-5151	702-399-1900
Fax Number:		

Boulder City LF	*Landfill Category:* Candidate

A. GENERAL LANDFILL INFORMATION

Landfill Owner:	Boulder Disposal Company	Annual Acceptance Rate (tons):	21,450
Landfill Owner Type:	Private	Year Annual Acceptance Rate Reported:	1998
Alternative Landfill Name:		Design Capacity (tons):	
City:	Boulder City	Acres Currently Landfilled (acres):	10
County:	Clark	Average Depth (feet):	30
State:	NV	Waste-in-Place (tons):	2,319,518
Year Open:	1930	*1998 Waste-in-Place (tons):*	2,388,759
Year Closed:	2017		

B. LANDFILL GAS COLLECTION

Estimated Methane Generation (mmscf/d):	0.69
LFG Collection System Status:	
Current LFG Collected (mmscf/d):	
Collection and Treatment System Required Under NSPS/EG:	No

C. LANDFILL GAS UTILIZATION

Current Utilization:

Utilization System Status:	Unknown
Utilization System Type:	Unknown
Utilization System Start Year:	
Electric Utility Provider(s):	
Natural Gas Provider(s):	
Energy Purchaser(s):	

Capacity:	Electricity Generation Project (MW)	OR	Direct Use Project (mmBtu/hr)
Estimated Potential Capacity:	2		22
Current Capacity:			
Planned Capacity:			

Utilities in County: Boulder City Electrical Distr System; Colorado River Commission of Nevada; Nevada Power Compan

D. ENVIRONMENTAL BENEFITS OF UTILIZATION

	Potential	Current
Methane Reduction (tons/yr):	3,975	0
CO2 Equivalent of CH4 Reduction (tons/yr):	83,477	0

Emissions Avoided by Fossil Fuel Displacement:	*Electricity Generation Project*		*Direct Use Project*	
	CO2 (tons/yr)	*SO2 (tons/yr)*	*CO2 (tons/yr)*	*SO2 (tons/yr)*
Coal:	16,575	105	11,970	109
Fuel Oil:	13,604	88	9,825	57
Natural Gas:	9,147	0	6,606	0

E. CONTACT INFORMATION

	Landfill Owner	Landfill Operator
Contact Name:	Teresa Mann	Jim Slade
Mailing Address:	2500 South Utah Street	1573 Foothill Dirve
Phone Number:	702-293-2276	702-293-2276
Fax Number:		

Elko City LF	*Landfill Category:* Candidate

A. GENERAL LANDFILL INFORMATION

Landfill Owner:	Elk City	Annual Acceptance Rate (tons):	21,450
Landfill Owner Type:	Public	Year Annual Acceptance Rate Reported:	1998
Alternative Landfill Name:		Design Capacity (tons):	
City:	Elko City	Acres Currently Landfilled (acres):	160
County:	Elko	Average Depth (feet):	60
State:	NV	Waste-in-Place (tons):	1,528,208
Year Open:	1953	*1998 Waste-in-Place (tons):*	1,597,672
Year Closed:	2024		

B. LANDFILL GAS COLLECTION

Estimated Methane Generation (mmscf/d):	0.69
LFG Collection System Status:	
Current LFG Collected (mmscf/d):	
Collection and Treatment System Required Under NSPS/EG:	No

C. LANDFILL GAS UTILIZATION

Current Utilization:

Utilization System Status:	Unknown
Utilization System Type:	Unknown
Utilization System Start Year:	
Electric Utility Provider(s):	
Natural Gas Provider(s):	
Energy Purchaser(s):	

Capacity:	Electricity Generation Project (MW)	OR	Direct Use Project (mmBtu/hr)
Estimated Potential Capacity:	2		22
Current Capacity:			
Planned Capacity:			

Utilities in County: Bonneville Power Admin; Idaho Power Company; Mt Wheeler Power Inc; Raft River Rural Elec Coo

D. ENVIRONMENTAL BENEFITS OF UTILIZATION

	Potential	Current
Methane Reduction (tons/yr):	3,992	0
CO2 Equivalent of CH4 Reduction (tons/yr):	83,826	0

Emissions Avoided by Fossil Fuel Displacement:	*Electricity Generation Project*		*Direct Use Project*	
	CO2 (tons/yr)	*SO2 (tons/yr)*	*CO2 (tons/yr)*	*SO2 (tons/yr)*
Coal:	17,364	110	12,021	109
Fuel Oil:	14,252	92	9,866	58
Natural Gas:	9,583	0	6,634	0

E. CONTACT INFORMATION

	Landfill Owner	Landfill Operator
Contact Name:	Evan Dodson	Evan Dodson
Mailing Address:	1751 College Avenue	1751 College Avenue
Phone Number:	702-777-7395	702-777-7395
Fax Number:		

Lockwood LF	*Landfill Category:* Candidate

A. GENERAL LANDFILL INFORMATION

Landfill Owner:	Reno Disposal/Refuse Service Inc.	Annual Acceptance Rate (tons):	1,000,000
Landfill Owner Type:	Private	Year Annual Acceptance Rate Reported:	1998
Alternative Landfill Name:		Design Capacity (tons):	
City:	Greenbrae	Acres Currently Landfilled (acres):	550
County:	Storey	Average Depth (feet):	140
State:	NV	Waste-in-Place (tons):	8,947,370
Year Open:	1987	*1998 Waste-in-Place (tons):*	10,736,844
Year Closed:	2092		

B. LANDFILL GAS COLLECTION

Estimated Methane Generation (mmscf/d):	3.16
LFG Collection System Status:	
Current LFG Collected (mmscf/d):	
Collection and Treatment System Required Under NSPS/EG:	No

C. LANDFILL GAS UTILIZATION

Current Utilization:

Utilization System Status:	Unknown
Utilization System Type:	Unknown
Utilization System Start Year:	
Electric Utility Provider(s):	
Natural Gas Provider(s):	
Energy Purchaser(s):	

Capacity:	Electricity Generation Project (MW)	OR	Direct Use Project (mmBtu/hr)
Estimated Potential Capacity:	10		99
Current Capacity:			
Planned Capacity:			

Utilities in County: Plumas-Sierra Rural Elec Coop; Sierra Pacific Power Company; Surprise Valley Electric Corp; Weste

D. ENVIRONMENTAL BENEFITS OF UTILIZATION

	Potential	Current
Methane Reduction (tons/yr):	18,294	0
CO2 Equivalent of CH4 Reduction (tons/yr):	384,178	0

Emissions Avoided by Fossil Fuel Displacement:	*Electricity Generation Project*		*Direct Use Project*	
	CO2 (tons/yr)	*SO2 (tons/yr)*	*CO2 (tons/yr)*	*SO2 (tons/yr)*
Coal:	78,138	494	55,091	501
Fuel Oil:	64,132	413	45,216	264
Natural Gas:	43,124	0	30,404	0

E. CONTACT INFORMATION

	Landfill Owner	Landfill Operator
Contact Name:	Bob Sack	Robert Baldwin
Mailing Address:	100 Vassar Street	100 Vassar Street
Phone Number:	702-329-8822	702-329-8822
Fax Number:		

Ormsby SLF	*Landfill Category:* Candidate

A. GENERAL LANDFILL INFORMATION

Landfill Owner:	City of Carson City	Annual Acceptance Rate (tons):	85,800
Landfill Owner Type:	Public	Year Annual Acceptance Rate Reported:	1998
Alternative Landfill Name:		Design Capacity (tons):	
City:	Carson City	Acres Currently Landfilled (acres):	
County:	Carson City	Average Depth (feet):	
State:	NV	Waste-in-Place (tons):	5,276,832
Year Open:	1965	*1998 Waste-in-Place (tons):*	5,606,634
Year Closed:	2012		

B. LANDFILL GAS COLLECTION

Estimated Methane Generation (mmscf/d):	1.72
LFG Collection System Status:	
Current LFG Collected (mmscf/d):	
Collection and Treatment System Required Under NSPS/EG:	No

C. LANDFILL GAS UTILIZATION

Current Utilization:

Utilization System Status:	Unknown
Utilization System Type:	Unknown
Utilization System Start Year:	
Electric Utility Provider(s):	
Natural Gas Provider(s):	
Energy Purchaser(s):	

Capacity:	Electricity Generation Project (MW)	OR	Direct Use Project (mmBtu/hr)
Estimated Potential Capacity:	5		54
Current Capacity:			
Planned Capacity:			

Utilities in County: Sierra Pacific Power Company; Western Area Power Admin

D. ENVIRONMENTAL BENEFITS OF UTILIZATION

	Potential	Current
Methane Reduction (tons/yr):	9,954	0
CO2 Equivalent of CH4 Reduction (tons/yr):	209,032	0

Emissions Avoided by Fossil Fuel Displacement:	*Electricity Generation Project*		*Direct Use Project*	
	CO2 (tons/yr)	*SO2 (tons/yr)*	*CO2 (tons/yr)*	*SO2 (tons/yr)*
Coal:	42,621	269	29,975	273
Fuel Oil:	34,981	225	24,602	143
Natural Gas:	23,522	0	16,543	0

E. CONTACT INFORMATION

	Landfill Owner	Landfill Operator
Contact Name:	Julius Ballardini	Julius Ballardini
Mailing Address:	P.O. Box 1658	P.O. Box 1658
Phone Number:	702-882-3380	702-882-3380
Fax Number:		